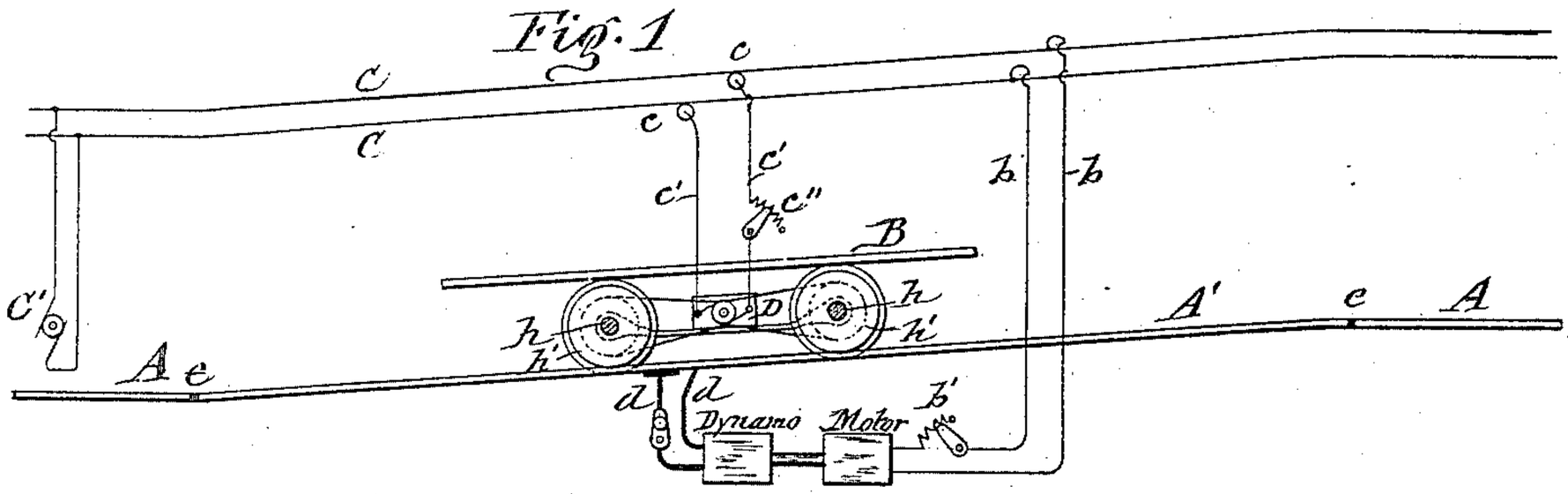
(No Model.)

M. W. DEWEY.

ELECTRIC TRACTION INCREASING SYSTEM.

No. 442,365. Patented Dec. 9, 1890.

Fig. 1



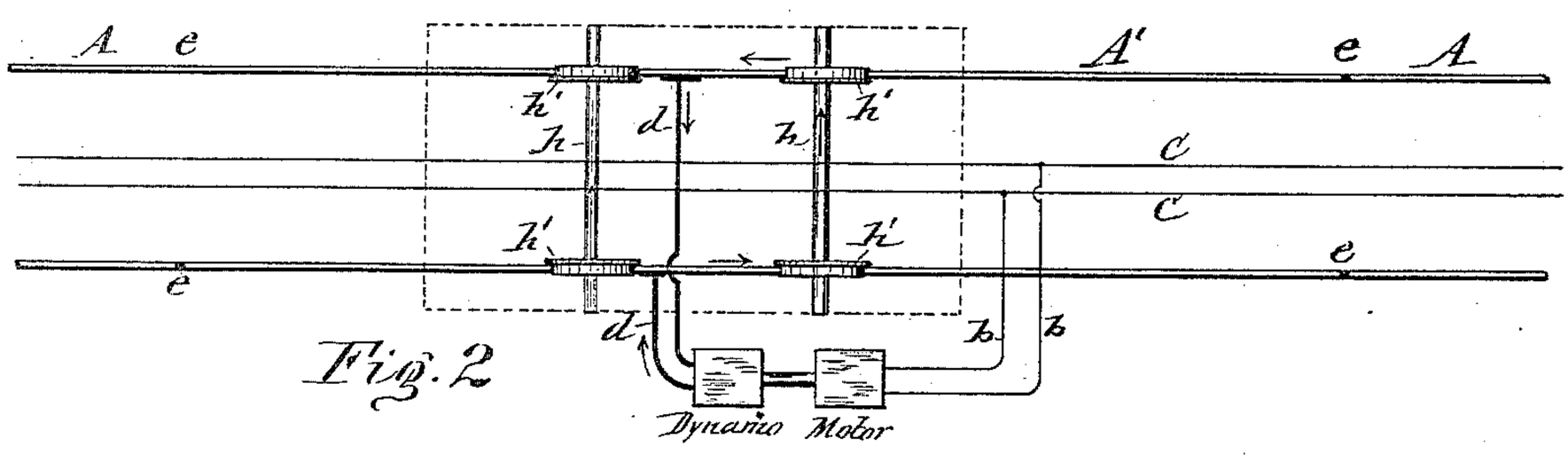


Fig. 2

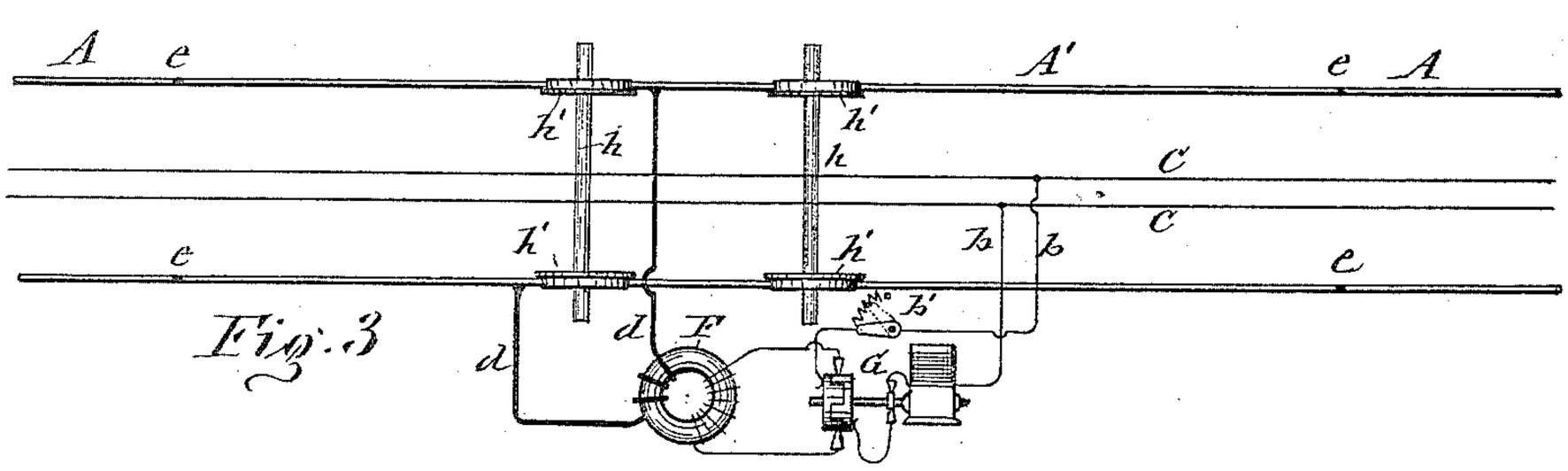


Fig. 3

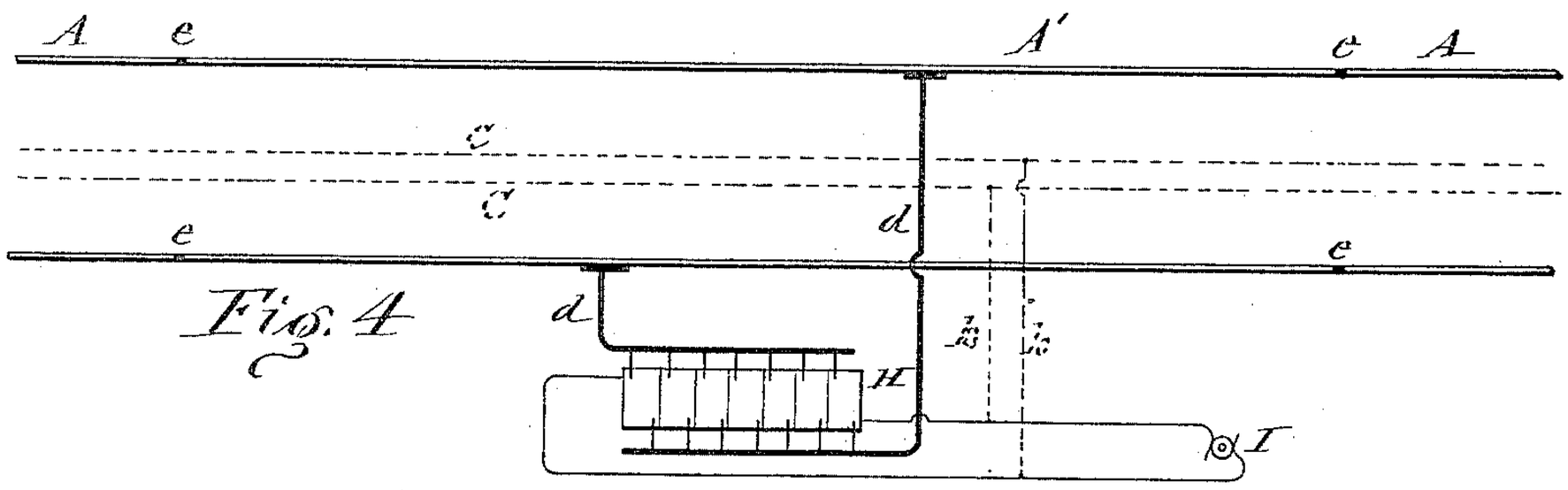


Fig. 4

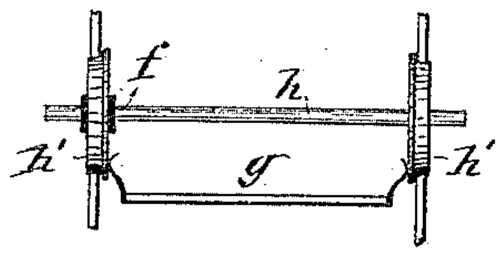


Fig. 5

WITNESSES:
J. J. Laasy.
C. L. Bundyson

INVENTOR:
Mark W. Dewey
BY
Duell, Laasy & Duell
his ATTORNEYS

UNITED STATES PATENT OFFICE.

MARK W. DEWEY, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE DEWEY CORPORATION, OF SAME PLACE.

ELECTRIC TRACTION-INCREASING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 442,365, dated December 9, 1890.

Application filed July 28, 1890. Serial No. 360,121. (No model.)

To all whom it may concern:

Be it known that I, MARK W. DEWEY, of Syracuse, in the county of Onondaga and State of New York, have invented new and useful Improvements in Electric Traction-Increasing Systems for Railways, (Case No. 66,) of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to a new and improved apparatus for electrically increasing the traction of vehicles or cars moving upon a metallic track.

The object of my invention is to provide means for electrically supplying increased traction to vehicles when they are upon grades or curves or other portions of the railway where an adhesive effect is necessary or desired between the track and wheels, and without supplying and carrying upon each and every vehicle moving on the railway extra heavy and expensive apparatus for this purpose. Usually the greater portion of a railway is level, or substantially so, and vehicles or cars traveling thereon do not need increased traction; but when they are upon the steep grades of the railway—such as those met with on opposite sides of canal-bridges, &c.—increased traction is necessary, and to supply railways having such grades with increased traction is the purpose of my invention.

To this end my invention consists in the combination, with a wheeled vehicle and a metallic track for the vehicle to move upon, of a stationary source of heavy current or currents connected to the rails of the track and two or more wheels of the vehicle, and one or more axles or other low-resistance conductor, extending between the wheels to electrically connect said rails together or complete the circuit between the rails.

My invention consists, also, in certain other combinations in the means hereinafter described, and specifically set forth in the claims.

In the drawings, Figure 1 indicates a side elevation of a railway at a grade, supplied with apparatus for accomplishing my method. Fig. 2 is a plan view of the same. Fig. 3 is another plan view of a railway-grade, showing different apparatus for the same purpose. Fig. 4 is another plan view of a railway-grade, showing other means for accomplishing my invention; and Fig. 5 shows a modified arrangement for conducting the current between the wheels when the axle is not used as the conductor.

Referring specifically to the drawings, A represents the metal track of the railway, and A′ is a grade thereof, upon which an electrically-propelled car B is shown.

C C are suspended line-working conductors arranged along the railway to supply current to the electric motor D on the car, through the movable contacts *c c* and the electric connections *c′ c′* carried upon the car.

C′ is the source of electricity, connected to the line-conductors. The line-conductors are shown as arranged overhead; but it will be obvious that they may be arranged in a conduit or other suitable position along the railway.

c″ indicates a current-regulator in one of the connections *c′* to control the current flowing through the motor D.

The rails of the grade portion A′ of the railway are insulated from the rails of the other or more level portion by insulation *e e*, &c., and the rails of one side of the track are insulated in any suitable manner from the rails on the other side of the track—that is, when there is no car on the said rails. The terminals *d d* of a suitable source of heavy current or currents are continually connected to the rails on the grade—one terminal to the rails of one side of the track and the other terminal to the rails of the other side.

The apparatus for accomplishing my invention may be greatly varied in form, and for this reason I have shown several forms that may be employed with advantage. I prefer, however, to equip the grade or other portion of the railway where increased traction is desired with the apparatus shown in Figs. 1 and 2, which consists of a direct or continuous current-transformer, having its primary circuit *b* connected to the line-conductors and its secondary circuit *d*, of low resistance, connected to the rails of the grade, as hereinbefore described. The said direct-current transformer is shown as a motor and dynamo me-

chanically connected together, so that the dynamo will be operated by the motor. The motor is in the circuit b, including an adjustable resistance b', to regulate the current therein, and the dynamo is in the circuit d, which may be formed of a copper rod or cable. d' is a circuit-breaker in the latter circuit. The unfeathered arrows in Fig. 2 show the direction and path of the current through the circuit when it is completed through the driving-axles h and wheels h' of a vehicle. It will be observed that the secondary or traction circuit d is normally open, and is not closed, except when the car is upon the grade, and is so arranged that no energy will be consumed when said traction-circuit is open. When the car approaches or moves onto the grade, the circuit d is automatically closed, and when the car leaves or moves off of the grade the circuit is automatically opened.

The apparatus requires no attention, and is always ready to operate at the proper time and place.

If an alternating current flows in the lines C C, a suitable inductional transformer may be used, similar to F in Fig. 3; but if it is desired to transform the currents with such a transformer when a direct continuous current flows in the lines it will be necessary to pulsate or alternate the current in the primary coil of the said transformer. This is effected, as shown clearly in Fig. 3, by placing a suitable electric alternator G in the circuit $b\ b$. In this case heavy alternating currents flow through the traction-circuit d.

Fig. 4 shows a railway-grade supplied from a stationary secondary battery H, located at the grade, and having its cells connected in the circuit d in parallel. The said battery may be kept charged by an electric generator I in the vicinity of the battery, or from the line-working conductors, when it is an electric railway, as indicated by dotted lines in said figure.

I do not limit myself to applying my invention to electric railways, as said invention may be advantageously applied to steam or other railways, and the traction-circuit may be independent of the motive power whether electric or not. When the wheels on an axle are insulated from each other—as, for instance, as shown at f in Fig. 5—so that the current cannot be passed between the wheels through the axle, a low-resistance conductor g may be provided having flexible contact-brushes attached to its ends and bearing against the inner sides of the wheels. The conductor g is suitably supported upon the gear of the car. If it is desired to pass the traction-current only through the driving-wheels of the car or cars on the insulated portion or grade of the railway, all other wheels may be insulated in any suitable manner, but preferably as shown at f in Fig. 5.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a wheeled vehicle and a metallic track for the vehicle to move upon, of a stationary source of heavy current or currents connected to the rails of the track, and two or more wheels of the vehicle and one or more axles or other low-resistance conductor extending between the wheels to electrically connect said rails together or complete the circuit between the rails, for the purpose described.

2. The combination, with an electrically-propelled wheeled vehicle, a metallic track for the vehicle to move upon, and a line-working conductor arranged along the track to supply current to the motor on the vehicle, of a stationary transformer connected to the line, a secondary circuit of said transformer with its terminals connected to the rails of the track, and two or more wheels of the vehicle and one or more axles or other low-resistance conductor extending between the wheels to electrically connect said rails together or complete the circuit between the rails, for the purpose described.

3. The combination, with an electrically-propelled wheeled vehicle, a metallic track for the vehicle to move upon, and a source of electricity to supply the motor on the vehicle, of an auxiliary stationary source of electricity, electric connections leading from the latter source and connected to the rails of the track, and two or more wheels of the vehicle and one or more axles or other low-resistance conductor extending between the wheels to electrically connect said rails together or complete the circuit between the rails, for the purpose described.

4. The combination, with an electrically-propelled wheeled vehicle, a metallic track for the vehicle to move upon, and a line-working conductor arranged along the track to supply current to the motor on the vehicle, of a stationary electric motor connected to the line, a dynamo mechanically connected to the motor, electric connections leading from the dynamo to the rails of the track, and two or more wheels of the vehicle and one or more axles or other low-resistance conductor extending between the wheels to electrically connect said rails together or complete the circuit between the rails, for the purpose described.

5. The combination, with a wheeled vehicle and a metallic track for the vehicle to move upon, of a stationary source of heavy current or currents connected to the rails of a portion of the track, insulation between said portion and the other portion of the track, and two or more wheels and one or more axles or other low-resistance conductor extending between the wheels to electrically connect said rails together or to complete the circuit between them, for the purpose described.

6. The combination, with a wheeled vehicle and a metallic track having a grade portion for the vehicle to move upon, of a normally-open electric traction-circuit connected to the

rails on the grade portion, and means to automatically close said circuit through two or more wheels of the vehicle, and one or more axles or other low-resistance conductor extending between the wheels when approaching the grade portion and to open said circuit when leaving said grade portion.

7. The combination, with a wheeled vehicle and a metallic track having a portion thereof insulated from the other portion and for the vehicle to move upon, of a normally-open electric traction-circuit, including when completed the rails of the insulated portion of the track and two or more wheels and one or more axles or other low-resistance conductor extending between the wheels, and means to automatically close the circuit when approaching said insulated portion of the track and to open said circuit when leaving said portion.

8. The combination, with a wheeled vehicle and a metallic track having an upgrade for the vehicle to move upon, of a stationary source of heavy current or currents connected to the rails on the upgrade, insulation between the rails of the upgrade and between said rails and the other portion of the track, and two or more wheels of the vehicle and one or more axles or other low-resistance conductor extending between the wheels to electrically connect said rails together or complete the circuit between the rails, for the purpose described.

9. In a traction-increasing system for a railway, the combination, with the rails insulated from each other, of a stationary source of electricity having its terminals connected to the rails, and a vehicle to travel on said rails adapted to electrically connect the rails together through the wheels and one or more axles, for the purpose described.

10. In a traction-increasing system for railways, a track having suitably-insulated conducting-rails for a vehicle to move upon, a stationary source of electricity, electric connections between the source and the rails, conducting-wheels for the vehicle, and one or more conducting-axles or other low-resistance conductor or conductors between the said wheels, as and for the purpose described.

11. In a traction-increasing system for railways, a track having suitably-insulated conducting-rails for a vehicle to move upon, a permanently-stationary source of electricity, electric connections between the source and the rails, conducting-wheels for the vehicle, and one or more conducting-axles or other low-resistance conductor or conductors between the said wheels, as and for the purpose described.

12. In a traction-increasing system for railways, a track having suitably-insulated conducting-rails for a vehicle to move upon, a stationary source of alternating currents, electric connections between the source and the rails, conducting-wheels for the vehicle, and one or more conducting-axles or other low-resistance conductor or conductors between the said wheels, as and for the purpose described.

In testimony whereof I have hereunto signed my name this 24th day of July, 1890.

MARK W. DEWEY. [L. S.]

Witnesses:
C. H. DUELL,
J. J. LAASS.